

What Is Claimed Is

1. A surgical apparatus providing access for a hand and/or surgical instruments through a body tissue incision while maintaining insufflation pressure within the body, the apparatus comprising:

a flexible, fluid-tight envelope having an interior volume and having opposite proximal and distal ends, a first opening in the envelope at the proximal end and a second opening in the envelope at the distal end, means for securing the envelope proximal end to the body tissue sealing the proximal end to the body tissue with the first opening adjoining the body tissue incision, and means for closing the second opening or securing the envelope distal end around an object inserted through the second opening into the envelope interior volume sealing the distal end around the object.

2. The apparatus of Claim 1, wherein:

the envelope has a third opening at the distal end and means for closing the third opening or securing the envelope distal end around an object inserted through the third opening into the envelope interior sealing the distal end around the object.

3. The apparatus of Claim 1, wherein:

the means for securing the envelope proximal end to the body tissue includes first and second annular collars, the first annular collar has an interior bore that adjoins the body tissue incision and the second annular collar has an interior bore that communicates with the interior volume of the envelope, and the first and second collars are releasably connected together.

4. The apparatus of Claim 3, wherein:

one of the first and second collars has an annular groove in its interior bore and the other of the first and second collars has an annular flange engaged in the groove, the groove and flange providing a sealed releasable connection between the first and second

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collars that enables the collars to rotate relative to each other.

5. The apparatus of Claim 3, wherein:

one of the first and second collars has means thereon for selectively sealing closed its interior bore.

6. The apparatus of Claim 3, wherein:

one of the first and second collars has a cap that can be secured to the one of the first and second collars to seal closed its interior bore.

7. The apparatus of Claim 4, wherein both the first and second collars are flexible and can be clamped closed to seal closed their interior bores.

8. The apparatus of Claim 3, wherein:

the first collar has axially opposite proximal and distal ends, the distal end is connected to the second collar, and (the proximal end has a tapered configuration that is wedged into the tissue incision) to secure and seal the first collar to the body tissue and thereby secure and seal the envelope to the body tissue.

9. The apparatus of Claim 3, wherein:

the first collar has axially opposite proximal and distal ends, the distal end is connected to the second collar, and the proximal end has an annular rim thereon that is insertable through the tissue incision to underly the tissue with the first collar projecting through the incision to secure and seal the first collar to the body tissue and thereby secure and seal the envelope to the body tissue.

10. The apparatus of Claim 9, wherein:

a panel having a hole therethrough is positionable over the body tissue with the first collar projecting through the panel hole to thereby further secure and seal the first collar to the body tissue and thereby secure and seal the envelope to the body tissue.

11. The apparatus of Claim 1, wherein:

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the envelope is constructed of an elastic, resilient material and the second opening in the envelope distal end is a slit opening that, in an at-rest condition of the second opening, is closed and is opened by stretching the envelope distal end on opposite sides of the slit opening.

12. The apparatus of Claim 11, wherein:

at least a pair of ears are provided on the distal end of the envelope with each ear of the pair being positioned on an opposite side of the slit opening where the ears can be grasped and spread from each other to open the slit opening.

13. The apparatus of Claim 1, wherein:

a band is secured to the envelope adjacent its distal end and the band has a length sufficiently long for binding the band around the distal end of the envelope and closing the envelope second opening.

14. The apparatus of Claim 13, wherein:

the band is a length of elastic cord secured to the envelope distal end.

15. The apparatus of Claim 13, wherein:

the band is a length of hook and loop fastener material secured to the envelope distal end.

16. The apparatus of Claim 12, wherein:

the band is a strip containing a length of malleable metal.

17. The apparatus of Claim 2, wherein:

the envelope has a general Y-shaped configuration with three projecting arms, the first opening in the envelope is positioned at an end of a first arm, the second opening in the envelope is positioned at an end of a second arm, and the third opening in the envelope is positioned at an end of a third arm.

18. The apparatus of Claim 1, wherein:

the envelope has a plurality of peripheral pleats formed thereon, the plurality of pleats are expandable to

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increase the interior volume of the envelope, and the plurality of pleats are compressible to decrease the interior volume of the envelope.

19. The apparatus of Claim 1, wherein:

the envelope has a cap removably secured and sealed to the distal end of the envelope, and removing the cap from the envelope provides access to the envelope interior volume.

20. The apparatus of Claim 19, wherein:

the second opening in the envelope is on the cap.

21. The apparatus of Claim 20, wherein:

a third opening in the envelope is on the cap, the third opening being substantially the same as the second opening.

22. The apparatus of Claim 1, wherein:

the means for closing the second opening or securing the envelope distal end around an object inserted through the second opening includes a valve in the form of a flexible, resilient toroid positioned in the second opening of the envelope, the toroid having a center opening that is expandable causing the center opening to open when an instrument or hand is inserted through the opening, and is retractable causing the center opening to close when the instrument or hand is withdrawn from the center opening.

23. The apparatus of Claim 22, wherein:

the toroid is constructed of a flexible and resilient foam material.

24. The apparatus of Claim 22, wherein:

the toroid is an inflatable bladder.

25. The apparatus of Claim 22, wherein:

an interior surface of the envelope engages around the toroid and holds the toroid in the second opening of the envelope by friction engagement, and the toroid is removable from the envelope second opening.

26. The apparatus of Claim 1, wherein:

the means for securing the envelope proximal end to the body tissue includes a resilient, cylindrical collar secured to the envelope proximal end, the collar has an interior bore that adjoins the first opening of the envelope, and the collar has an annular flange surrounding the collar, the collar is secured to body tissue by securing the flange to the body tissue.

27. The apparatus of Claim 26, wherein:

- the flange is secured to the body tissue by adhesive tape.

28. The apparatus of Claim 26, wherein:

the flange is secured to the body tissue by sutures.

29. The apparatus of Claim 1, wherein:

the means for closing the second opening or securing the envelope distal end around an object inserted through the second opening includes opposed, flexible tongue and groove strips on the envelope on opposite sides of the second opening, the tongue and groove strips being connectable to each other to close the second opening and being separable from each other to open the second opening.

30. A method of providing access for a hand and surgical instruments through a body tissue incision while maintaining insufflation pressure within a body cavity accessible through the tissue incision, the method comprising the steps of:

making an incision through the body tissue;

securing a flexible, fluid-tight envelope having a proximal end with a first opening and an opposite distal end with a second opening to the body tissue with the envelope proximal end sealed to the body tissue and the first opening adjoining the incision;

sealing closed the second envelope opening; and

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insufflating a body cavity within the tissue that is accessible through the tissue incision and the envelope.

31. The method of Claim 30, further comprising: securing the envelope to the body tissue by wedging a tapered end of a tubular collar connected to the first opening at the proximal end of the envelope into the incision causing the incision to stretch around the tapered end of the collar and thereby securing and sealing the collar to the incision.

32. The method of Claim 30, further comprising: securing the envelope to the body tissue by inserting an annular flange of a tubular collar connected to the first opening at the proximal end of the envelope into the incision causing the incision to stretch around the collar and thereby securing and sealing the collar to the incision.

33. The method of Claim 30, further comprising: accessing the body cavity with an object while maintaining insufflation pressure within the cavity by clamping the envelope first opening closed, opening the envelope second opening, inserting the object into the envelope interior through the second opening, sealing closed the second opening around the object, reopening the first opening and inserting the object from the envelope interior through the first opening and the tissue incision into the body cavity.

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